

14 TeV CMS Simulations and Webtools



8/5/2013

John Michael Farmer (Clemson University), SIST Intern

In collaboration with: Jake Callahan (Iowa State University)

Supervisors: Pushpa Bhat and Leonard Spiegel

Abstract

In 2015, the LHC will run at (pp) center of mass collision energy of 14 TeV and luminosity $10^{34} \text{ cm}^{-2} \text{ s}^{-1}$, an upgrade from its 2012 run at 7 TeV and $\sim 5 * 10^{33} \text{ cm}^{-2} \text{ s}^{-1}$. This will cause increased radiation load on the detector, and the electronics must be properly shielded. The radiation environment in the detector may be estimated through Monte Carlo simulations of proton-proton (pp) collisions occurring inside the CMS detector. To this end, we examine fluence and dose in the CMS detector using data from Monte Carlo simulations performed with the software package MARS by P.C. Bhat, A.P. Singh, and N.V. Mokhov in 2008 [1]. We have designed a suite of webtools for calculation and graphical display of fluence data from these simulations and have collected a much larger sample of data by running simulations using the Monte Carlo simulation package FLUKA.